

A sustainable eel population

The case for active management ?

by

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The unique life-cycle of the eel means that measures for its conservation will differ in some essential respects from those applied to all other species of fish. Seven key elements are:

- The single breeding ground is remote from the coast and accessible to vessels only at very substantial cost. This means that there is no possibility of controlling any aspect of breeding or larval life in the wild.
- It is misleading to talk of the possibility of ‘extinction’. The two Atlantic eel species have survived the entire Pleistocene ice age in the course of which habitat destruction and alteration of ocean currents occurred on a scale which dwarfs current man-made impacts on continental populations and predicted changes due to global warming.
- Artificial propagation of the eel is still in its early experimental stages and is far from offering a practical alternative to the current aquacultural methods which have yet to produce potential breeding stock.
- Natural mortality of the glass eel is so high that there is evidence that the operation of commercial fisheries for this life stage has little or no impact on the population of yellow eel.
- There is wide variability in growth rate and age of maturity within localised populations. All population models therefore refer to spectra of a number of age groups.
- Yellow eel populations exist in a very large number of segregated habitats. It is therefore not possible to consider the yellow eel population as a single entity - even though the breeding stock is panmictic and larval distribution appears to be random.
- While the eel species are not facing extinction, the eel fishery and trade are imminently threatened by natural causes. In these circumstances, the reason for urgent action is to save the livelihoods of the persons involved together with a wide range of activities, including preparation and consumption of a nutritious food, which have a long tradition. In the case of these unique fishes, we are dealing with a cultural and an economic problem rather than a matter of biodiversity. The position of WWF and CITES in the matter of eels must be questioned. They are concerned primarily with species numbered in thousands or fewer individuals for which potential extinction is a reality, rather than those involving billions and which are not facing extinction.

Stocks of the commercial species of sea-fish in general can seldom be improved by artificial means other than control of fishing effort. Populations of juvenile salmonids are usually limited by the extent of their habitat and, except in some special cases, cannot be enhanced by artificial stocking.

In contrast, eel management practice since late in the 19th century has shown incontrovertibly that overland transport of glass eel leads to enhancement of yellow and silver eel production. Highly successful transfers have been made to lakes in Germany, Poland and Hungary which had been beyond the natural range of elver ascent and therefore had never contained eel populations. In all cases these resulted in a very high survival from glass eel to silver eel. Survival in Lough Neagh from glass eel to market size is 2 to 1. This rate is far in excess of anything in the general run of fish survival and proves that, even at times of a maximum input of glass eel, Lough Neagh had more than adequate living space for the population. Very high production figures were also recorded in the continental lakes to which glass eel were introduced.

The conclusion from the above considerations is that there are two practicable means of enhancing the escapement of potential spawning eel. One is to discontinue fishing. The other is to transfer glass eel overland to habitats in which they have space to develop to the silver stage *even when the stocks in such habitats are exploited*.

Furthermore, the yellow eel migrates only upstream and rarely, if ever, moves out of the lagoon or catchment which it has entered. Therefore, any scheme for enhancement based on transfer of glass eel must be planned on a catchment by catchment rather than a global continental basis. In this context the Baltic and neighbouring regions of the North Sea may be considered as 'catchments'. Comparable marine populations of eel on the British and Irish coasts and farther south are virtually unknown.

The efficacy of stocking by transfer of glass eel cannot be questioned, nor can the high natural mortality of glass eel in tidal waters. Therefore transfer is bound to result in an increased escapement of silver eel.

An extremely important concept in the capture of glass eel is that the best prices are obtained by the fisherman for supplying viable living stock. This is the antithesis of normal fishing practice which aims to provide dead fish for consumption. While a substantial proportion of the catch of glass eel is directed towards intensive aquaculture and therefore not to production of breeding stock, most of the remainder go to the stocking of open waters and consequent enhanced escapement of breeding adults.

This means that the 'do nothing' approach, often acceptable in conservation of other species, is counter-productive in the case of the eel. The simple cessation of marketing and fishing in this context may be construed as 'do nothing'. In the current situation of dramatically decreasing recruitment, all possible steps to increase the survival rate of this depleted stock must be taken. Transfer of glass eel is one of the most effective known to science and to the fishing industry.

The results of transfer of glass eel to Lough Neagh, established over many years and closely monitored by scientists, has demonstrated, beyond any doubt, greatly increased survival. The Severn-Lough Neagh project can count on success in enhancing the spawning escapement of eel and will serve as an invaluable pilot scheme for a system capable of wide application throughout Europe.

Scientific cases have been made concerning two important possibilities, potential namely genetic contamination and that transfer beyond the catchments in which glass eel arrive may lead to disorientation and loss of consequent silver eel.

The hypotheses underlying both are extremely interesting and worthy of development. Eel tracking experiments in the Baltic have demonstrated the possibility that transferred silver eel may get lost and possibly fail to reach the breeding ground. But such experiments have involved extremely small samples and have an element of the uncertainty principle. The very act of tagging the experimental

eel may be sufficient to upset their migration. Indeed this has been shown to be the case in experiments in Ireland.

The principle of attempting to maintain the genetic purity of populations of migratory species, such as the salmon, is excellent in theory. It is less than certain that any cases of material damage to stocks resulting from transfers have ever taken place. Moreover, the significance of genetic diversity, if indeed it exists, in the case of the eel has not been established.

In remedying a situation as urgent as that of the eel, it is essential to take steps based on established evidence rather than on theories which are in the course of development. Glass eel transfer, within and across catchments, has enjoyed more than a century of proven success. This includes the production and escapement of silver eel from major catchments in which this had never before occurred. It means a certainty of enhanced production of marketable eel together with additional escapement of silver eel. These latter are without question potential spawners. The fact that limited experimental results have shown that they might not be spawners should in no way be accepted as evidence that they will not spawn. In these circumstances, the first priority should be within-catchment transfer. All glass eel surplus to the calculated holding capacity of such catchments should then be made available for the stocking of other catchments.

The within-catchment transfer will unquestionably increase the number of spawners. Leaving the surplus glass-eel uncaught will, with equal certainty, ensure that they serve neither man nor their own species, since the great majority will die long before attaining maturity. Transfer across catchments will lead to certain survival to maturity and almost certain enhancement of the spawning stock. It remains the most effective management procedure known science.